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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,519	08/16/2005	Ernst-Martin Billing	LE/cc 020177US	9361
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EXAMINER				
TAL XIUNYU				
ART UNIT		PAPER NUMBER		
1795				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/535,519

Applicant(s)

BILLING ET AL.

Examiner

Xiuyu Tai

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SE-US)
Paper No(s)/Mail Date 5/18/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "an evaporator" and "a condenser" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: the arrangement of specification is not in a proper order.

Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
6. Claims 11- 13, 15-17, 21, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (U.S. 4,411,56) in view of Igarashi et al (U.S. 6,299,704) and in evidence of Weng (U.S. 5,702,632).
7. Regarding claims 11, 15, and 16, Bennett et al disclose a boiling coolant ozone generator. The ozone generator comprises; (1) an inner metal tubular electrode 18 and an outer tubular electrode 12 (Figure 1; col. 7, line 20 & 27-28); (2) an exterior container 10 (Figure 1; col. 7, line 17); (3) a support structure for both electrodes (col. 7, line 31-33); and (4) a condenser 38 (Figure 2; col.9, line 17). The region 20 between electrodes

provides space for gas passage (Figure 2; col. 7, line 30-31) and a coolant 26 is passed along region 28 and 30 (Figure 1: col. 8, line 1-5). As the coolant 26 is passed along electrodes, portion of coolant is vaporized by the heat of the electrodes to produce boiling coolant fluid; as a result, the electrodes serve as an evaporator for the boiling coolant (col. 8, line 53-56). Bennett further teaches that a refrigeration source or a heat pump 46 can be used to effectively cool the surface of electrodes and to recirculate the coolant 26 through the condenser 38 (col. 9, line 53-57). Conventionally, a compressor is provided in a refrigeration source or a heat pump as is evident by the teaching of Weng (ABSTRACT; col. 3, line 44-46).

8. Bennett fails to teach the device constructed with specified steel. However, Igarashi et al disclose heat resisting steel that is useful under high temperature and high pressure (col. 1, line 7-10). The disclosed steel comprises 8-15% of chromium, 0-2% of molybdenum, 0.05% of aluminum, and 0.1-1.5% of nickel (No. 2 in Table 1; claim 2-4) which is within the claimed range of the steel composition. As is known in the art, the formation of ozone results in generating heat (col. 7, line 62-64 of Bennett) and the usage of a boiling coolant builds up pressure in the ozone generator of Bennett (col. 8, line 40-47). Therefore, it would be obvious for one having ordinary skill in the art to construct the ozone generator of Bennett with the steel having composition as suggested by Igarashi in order for the ozone generator of Bennett to withstand high temperature and high pressure during the operation.

9. Regarding claim 12, the steel as suggested by Igarashi comprises 8-15% of chromium (No. 2 in Table 1; claim 2-4), reads on the instant claim.

10. Regarding claim 13, since the steel of Igarashi has same composition as the cited steel, it is inherent that the steel of Igarashi has the claimed characteristics.
11. Regarding claims 17, 21, and 25, the steel of Igarashi is able to withstand a pressure up to 300 atmosphere (equivalent to 354 bar, col. 1, line 44-45), reads on the instant claims.
12. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 11 above, and further in view of Bonitz (U.S. 3,977,459).
13. Regarding claim 14, Bennett/Igarashi fails to teach the reactor constructed with the cited steel. However, Bonitz discloses a work piece casting with shaped metal. The reference teaches that stainless steel, such as NO1.4000 (X6Cr13), is inert under reaction condition and can withstand high temperature and pressure (col. 5, line 33-35). Therefore, it would be obvious for one having ordinary skill in the art to construct the ozone generator of Bennett/Igarashi with stainless steel as suggested by Bonitz in order for the ozone generator of Bennett/Igarashi to withstand high temperature and high pressure and to be inert to reaction during the operation
14. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 11 above, and further in view of Weng (U.S. 5,702,632).
15. Regarding claim 18, Bennett/Igarashi fails to teach tetrafluoroethane as a coolant. However, Weng discloses a refrigeration system for cycling non-CFC mixture. Weng teaches that fluorocarbon compounds are linked to deplete ozone (col. 1, line 20-

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23) and non- CFC compounds, such as 1, 1,1,2-tetrafluoroethane, is a potential replacement for fluorocarbon compounds in refrigeration and cooling system (col. 1, line 23-26 & col. 3, line 56-58). Therefore, it would be obvious for one having ordinary skill in the art to replace the fluorocarbon compounds used in the ozone generator of Bennette/Igarashi with 1, 1, 1, 2-tetrafluoroethane as suggested by Weng in order to avoid depleting produced ozone during the operation of the ozone generator of Bennette/Igarashi, hence increasing the ozone production efficiency.

16. Regarding claim 19, Bennett/Igarashi fails to teach an aerosol separator. However, Weng discloses a refrigeration system for cycling non-CFC mixture. The system comprises a conventional compressor and a heat exchanger (Figure 1; col. 3, line 41-44). The heat exchanger further includes liquid/gas separator 11(Figure 2) to separate liquid refrigerant from vapor and to return to the compressor (col. 3, line 49-50). Therefore, it would be obvious for one having ordinary skill in the art to include a liquid/gas separator as suggested by Weng in the ozone generator of Bennett/Igarashi in order to separate refrigerant from vapor for better cooling efficiency. It should be noted that the liquid/gas separator is arranged between the compressor and the evaporator.

17. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 11 above, and further in view of Arai et al (U.S. 5,499,508).

18. Regarding claim 20, Bennett/Igarashi fails to teach means for controlling pressure. However, Arai et al disclose an air conditioner employing a refrigerating cycle

using boiling coolants. The system comprises a four-way valve 3 for supplying the boiling coolants (Figure 1; col. 3, line 60-61) and an electric expansion valve 7 for reducing the pressure of the boiling coolant (Figure 1; col. 3, line 65-67). Therefore, it would be obvious for one having ordinary skill in the art include control valves as suggested by Arai in the ozone generator of Bennett/Igarashi in order to supply the boiling coolants with regulated the pressure under safe operation conditions.

19. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 15 above, and further in view of Weng (U.S. 5,702,632).

20. Regarding claim 22, Bennett/Igarashi fails to teach tetrafluoroethane as a coolant. However, Weng discloses a refrigeration system for cycling non-CFC mixture. Weng teaches that fluorocarbon compounds are linked to deplete ozone (col. 1, line 20-23) and non- CFC compounds, such as 1, 1,1,2-tetrafluoroethane, is a potential replacement for fluorocarbon compounds in refrigeration and cooling system (col. 1, line 23-26 & col. 3, line 56-58). Therefore, it would be obvious for one having ordinary skill in the art to replace the fluorocarbon compounds used in the ozone generator of Bennette/Igarashi with 1, 1, 1, 2-tetrafluoroethane as suggested by Weng in order to avoid depleting produced ozone during the operation of the ozone generator of Bennette/Igarashi, hence increasing the ozone production efficiency.

21. Regarding claim 23, Bennett/Igarashi fails to teach an aerosol separator. However, Weng discloses a refrigeration system for cycling non-CFC mixture. The system comprises a conventional compressor and a heat exchanger (Figure 1; col. 3,

line 41-44). The heat exchanger further includes liquid/gas separator 11 (Figure 2) to separate liquid refrigerant from vapor and to return to the compressor (col. 3, line 49-50). Therefore, it would be obvious for one having ordinary skill in the art to include a liquid/gas separator as suggested by Weng in the ozone generator of Bennett/Igarashi in order to separate refrigerant from vapor for better cooling efficiency. It should be noted that the liquid/gas separator is arranged between the compressor and the evaporator.

22. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 15 above, and further in view of Arai et al (U.S. 5,499,508).

23. Regarding claim 24, Bennett/Igarashi fails to teach means for controlling pressure. However, Arai et al disclose an air conditioner employing a refrigerating cycle using boiling coolants. The system comprises a four-way valve 3 for supplying the boiling coolants (Figure 1; col. 3, line 60-61) and an electric expansion valve 7 for reducing the pressure of the boiling coolant (Figure 1; col. 3, line 65-67). Therefore, it would be obvious for one having ordinary skill in the art include control valves as suggested by Arai in the ozone generator of Bennett/Igarashi in order to supply the boiling coolants with regulated the pressure under safe operation conditions.

24. Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bennett et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 16 above, and further in view of Weng (U.S. 5,702,632).

25. Regarding claim 26, Bennett/Igarashi fails to teach tetrafluoroethane as a coolant. However, Weng discloses a refrigeration system for cycling non-CFC mixture. Weng teaches that fluorocarbon compounds are linked to deplete ozone (col. 1, line 20-23) and non- CFC compounds, such as 1, 1,1,2-tetrafluoroethane, is a potential replacement for fluorocarbon compounds in refrigeration and cooling system (col. 1, line 23-26 & col. 3, line 56-58). Therefore, it would be obvious for one having ordinary skill in the art to replace the fluorocarbon compounds used in the ozone generator of Bennette/Igarashi with 1, 1, 1, 2-tetrafluoroethane as suggested by Weng in order to avoid depleting produced ozone during the operation of the ozone generator of Bennette/Igarashi, hence increasing the ozone production efficiency.

26. Regarding claim 27, Bennett/Igarashi fails to teach an aerosol separator. However, Weng discloses a refrigeration system for cycling non-CFC mixture. The system comprises a conventional compressor and a heat exchanger (Figure 1; col. 3, line 41-44). The heat exchanger further includes liquid/gas separator 11 (Figure 2) to separate liquid refrigerant from vapor and to return to the compressor (col. 3, line 49-50). Therefore, it would be obvious for one having ordinary skill in the art to include a liquid/gas separator as suggested by Weng in the ozone generator of Bennett/Igarashi in order to separate refrigerant from vapor for better cooling efficiency. It should be noted that the liquid/gas separator is arranged between the compressor and the evaporator.

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27. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over et al (U.S. 4,411,56) and Igarashi et al (U.S. 6,299,704) as applied to claim 16 above, and further in view of Arai et al (U.S. 5,499,508).

28. Regarding claim 28, Bennett/Igarashi fails to teach means for controlling pressure. However, Arai et al disclose an air conditioner employing a refrigerating cycle using boiling coolants. The system comprises a four-way valve 3 for supplying the boiling coolants (Figure 1; col. 3, line 60-61) and an electric expansion valve 7 for reducing the pressure of the boiling coolant (Figure 1; col. 3, line 65-67). Therefore, it would be obvious for one having ordinary skill in the art include control valves as suggested by Arai in the ozone generator of Bennett/Igarashi in order to supply the boiling coolants with regulated the pressure under safe operation conditions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuyu Tai whose telephone number is 571-270-1855. The examiner can normally be reached on Monday - Friday, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. T./

Examiner, Art Unit 1795

7/8/2008

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795